CELLULAR SYSTEM SOLUTION 6710

Compact, low-power system solution for HSDPA

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This highly integrated 3.5G solution uses a fully validated modem and advanced multimedia technology to reduce design complexity and time-to-market. It provides an evolutionary step that brings ST-Ericsson leadership in EDGE and TD-SCDMA to the HSDPA market. Our 6710 system solution is a very powerful yet very affordable 3G/HSDPA/EDGE solution for the value added services (VAS) 3G market.

KEY FEATURES

Telecom

- ARM926EJ @ up to 416 MHz
- DDR SDRAM 166MHz
- 2 DSP Real16025
- DCXO
- EGPRS class 12, UL/DL 236/236 Kbit/s, DTM class 11
- Single antenna interference cancellation (DARP)
- UMTS/FDD R6, UL/DL 384/384 Kbit/s
- HSDPA 3GPP R6, category 8, DL 7.2-Mbits
- Worldwide multi-band, US feature pack
- LFBGA424 package, 10 x 10 mm (POP also available)

Multimedia

- Music decoding: MP3, AAC, AAC+, eAAC+, WMA
- Music encoding: MP3, AAC 48 kHz
- MIDI 128 voices (64 voices)
- HW decode MPEG 4/H.263/H.264/VC-1/DivX CIF 30 fps
- HW encode MPEG 4/H.263 CIF 30 fps
- HW JPEG encode/decode
- Video streaming H.264/QVGA
- 3-MPixel YUV, 5-Mpixel JPEG camera with smooth zoom
- Display resolution supported WQVGA, 16 M colors
- 1 x 650 mW class-D amplifier
- TV-out (CVBS analog)
- Adaptive backlight
- HW optional: UX pack (user experience)
  - OpenVG
  - One shot panorama
  - High sensitivity mode
  - Video stabilization
  - Horizon leveling

Connectivity

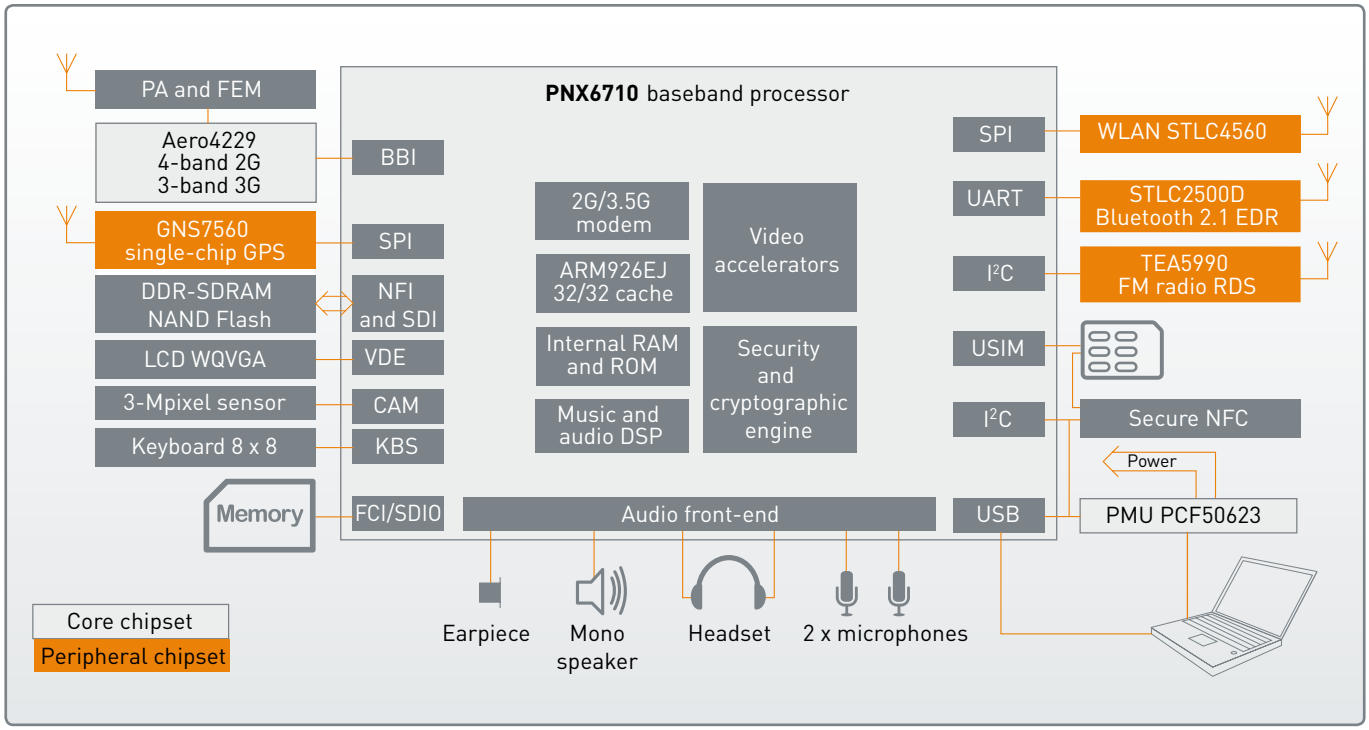
- Comprehensive connectivity interfaces: USB-HS, SPI, SDIO, SD, MMC, MS
- A-GPS SUPL and CP 2G and 3G
- System level extensions for NFC, Bluetooth® EDR V2.1, FM

Autonomy

- Standby 2 mA (2G DR x 2)
- Standby 1.55 mA (3G K=7)
- Talk Time 180 mA (10 dBm, RB)
- MP3 22 mA
- MPEG-4 100 mA

Single-core Linux solution

- Affordable open-OS solution with single processor core and virtualization
- Partnerships with leading third-party solution providers
- Single memory subsystem reduces system cost
- Ideal for LiMo and Android enabled terminals



Cellular system solution 6710 application diagram

Cellular system solution 6710 is well suited to a wide range of multimedia applications, including digital music players, digital video camcorders and still-picture cameras, digital audio recorders, personal media players, mobile TV receivers, gaming devices, navigation devices, smartphones, and feature phones.

The 6710 supports advanced complex media use cases with at least three levels of multi-tasking. For example, the user can listen to music while taking a picture and receiving calls at the same time. Without adding costly companion ICs to the system, the design lets consumers take full advantage of multimedia services. They can enjoy advanced HSDPA connectivity, listen to music, capture Mpixel-sized images and view them on a TV set, record multimedia streams, and synchronize content with a personal computer.

By combining proven modem technology with the Linux OS, the 6710 makes the open-source world accessible, and enables handset manufacturers significantly reduce the system cost of open-OS devices.

HIGHEST INTEGRATION AND LOWEST SYSTEM COST

The modem PCB includes 170 components, yet measures less than 700 mm^2. Extra-small packages create an area-efficient solution that makes it easy for handset designers to embed more functionality in the system. High integration also leads to design savings, with a phone eBOM of less than $30.

The Aero4229 analog I/Q baseband interface HSPA/EDGE transceiver is packaged in a 7 x 7 mm LFBGA135 package. It enables miniature multimode radio designs while embedding the 3G Rx LNAs and removing the need for 3G receive or transmit SAW filters. Manufactured in CMOS technology, it enables customers to benefit from the economies of scale of our high-volume process technology proven with the Aero range of 2.5G transceivers.

The PCF50623 is a small and highly integrated power management unit (PMU). It enables complete system-level power management, extends battery life and reduces PCB footprint. Housed in a compact VFBGA100 package (6 x 6 mm), it integrates a complete battery charger with support for a wall-adapter as well as USB charging, and has a series of advanced features that enable real-time, software-controlled power management. The PCF50623 offers a comprehensive set of power-supply resources. It integrates three step-down DC-DC converters with internal switches for baseband core, memory, IO and RF transceiver supply. Furthermore, it has a dedicated SIM card supply and fourteen additional linear regulators (LDOs) to power the USB, high-speed memory card and all other multimedia features. All the power supplies support on/off and an ECO mode, which significantly reduces internal power consumption. The on/off and output voltage of every power supply is controlled via I^2C-bus software and GPIO control pins.

MULTIMEDIA FOR A MORE CONNECTED LIFE

The 6710's multimedia engine has the right hardware to capture and play content in even the most challenging environments. There is no need for an external coprocessor, so there are more MIPS available for running applications.

The platform delivers enhanced multimedia experiences, delivering smooth video decoding at CIF resolutions for codecs including H.263, MPEG-4, H.264, VC-1, and DivX. This means consumers can generate more content and share it more easily, synchronizing with computers or remote servers. R6 data throughput adds a new level of content sharing, too, and lets consumers make the most of flat-rate services.

The 6710's baseband processor supports the most common music codecs (MP3, AAC, AAC+, eAAC+, WMA, MIDI, 128 polyphony), and uses hardware for acceleration to offload the main processor. As a result, consumers can enjoy more concurrent use cases and more complex media use cases.

LOW POWER FOR LONGER OPERATING TIME AND A BETTER USER EXPERIENCE

The 6710 is implemented in a state-of-the-art, 65-nm process with very low power consumption. The design uses several advanced techniques, including dynamic voltage scaling, improved converter technology, enhanced algorithms, and reduced losses during sleep, to save more battery power than competing solutions. The hardware-acceleration scheme gives the design an additional boost in power efficiency.

SYSTEM SOLUTION 6710 FAMILY

	HSDPA	CPU	Display	Camera	Video	USB	TV-out	Polyphony	UX pack*
6710X Linux	7.2 Mbits	416 MHz	WQVGA	3-Mpixel	Play CIF/30fps MPEG-4/H.263/H.264/VC-1/DivX Rec. CIF/30fps MPEG-4/H.263	HS OTG	yes	128 channels	-
6710	7.2 Mbits	312 MHz	WQVGA	3-Mpixel	Play CIF/30fps MPEG-4/H.263/H.264/VC-1/DivX Rec. CIF/30fps MPEG-4/H.263	HS	yes	128 channels	option
6709	3.6 Mbits	312 MHz	QVGA	3-Mpixel	Play CIF/30fps MPEG-4/H.263/H.264/VC-1/DivX Rec. CIF/30fps MPEG-4/H.263	FS	-	64 channels	option
6708	-	312 MHz	QVGA	3-Mpixel	Play CIF/30fps MPEG-4/H.263/H.264/VC-1/DivX Rec. CIF/30fps MPEG-4/H.263	FS	-	64 channels	option
6707	-	208 MHz	QCIF+	2-Mpixel	Play QCIF/15fps MPEG-4/H.263 Rec. QCIF/15fps MPEG-4/H.263	FS	-	64 channels	-

* UX Pack (user experience) is optional on system solution 6708, 6709 and 6710, and includes OpenVG, one-shot panorama, horizon leveling and high-sensitivity mode

OpenVG 2D-GRAPHICS HW ACCELERATION

With its direct memory fetch mechanism, this embedded accelerator boosts the bitmap part of the OpenVG rendering pipeline, including geometric transformations, color space conversions and blending, while reducing the CPU load. With only a fraction of the CPU load, this block enables remarkable acceleration of graphic transformations on a full size WQVGA display.

Combined with an OpenVG software stack, it allows the customer to easily develop an appealing user interface and still support complex multimedia use cases in parallel.

One-shot panorama

Allows you to take a panoramic picture as if you were recording a video by simply scanning the scene.

Horizon leveling

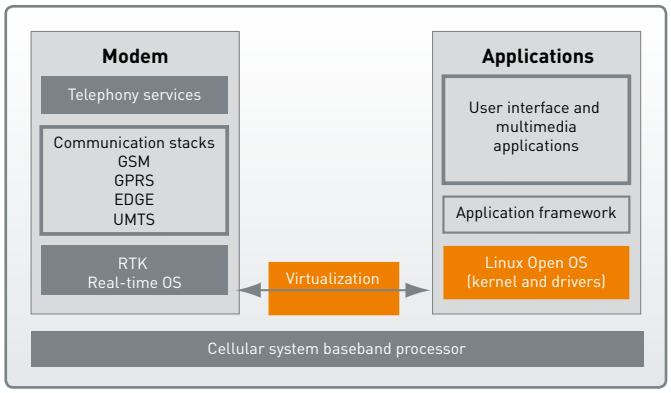
Still pictures are often slanted. The inclination is computed through image analysis and corrected through free-rotation inclination compensation.

High-sensitivity mode

Improves lighting of under-exposed dark areas by boosting illumination while keeping contrast and details.

6710X: SINGLE-CORE LINUX SOLUTION

The 6710X provides a common software platform for 2G, 3G, 3.5G, and TD-SCDMA. The solution combines an efficient modem, running on a real-time OS, with an application environment based on Linux. Both the RTOS and Linux kernel run on the same processor and are linked with a virtualization mechanism. The 3.5G modem is controlled via Linux drivers and AT-commands. The single-core approach, where modem and applications are combined on the same hardware, allows the building of considerably cheaper systems, as only one memory subsystem is needed. The single-core approach streamlines operations and also makes it easy to prototype software on a PC. The Linux operating system allows the customer to use generic platform services such as audio, multimedia, user interface acceleration, and connectivity.
As well as the Linux kernel, it is possible to use many solutions that are based on open source alliances such as Android, LiMo, or any proprietary Linux solution providing state-of-the-art 3G features including video telephony, accelerated media, and customizable user interface.



Dual software stack on a single-core solution

COST-EFFECTIVE COMPACT SOLUTION

The system solution 6710 multimedia baseband processor is available in two variants: a standalone device or a package-on-package (PoP) with memory on top. With its core 3-chip footprint totaling only 185 mm^2, the standalone system solution 6710 is one of the most compact solutions able to provide this level of multimedia without the addition of a multimedia processor or an application engine. Only 44 mm^2 of additional PCB area are required by the system solution 6710 PoP to also include the memory. Furthermore, thanks to the maturity and level of integration of this solution very few external glue components are needed. Some of the typical external components that are not needed with system solution 6710 are: USB charge IC, additional LDO regulators or DC-DC regulators, USB 2.0 transceiver, audio switches, audio amplifiers.

FAST TIME TO MARKET

System solution 6710 comes with a reference design, development environment, industrialization tools and an industry approved telecom and multimedia stack. It is supported by a worldwide sales and application support organization. System solution 6710 is sampling in Q3 2008 with volume ramp-up in Q1 2009.

Type name	Function	Package	Package size
Reference board for product development			
	Reference design with focus on 2G/3G protocol stack regression and multimedia functionality	-	-
Core chipset			
PNX6707/6708/6709/6710/6710X	Multimedia baseband processor	LFBGA424 LFBGA487 POP	10 x 10 mm (1) 12 x 12 mm (2) 12 x 12 mm (3)
PCF50623	Power management unit	VFBGA100	6 x 6 mm
Aero4229	Multi-band 2G/3G transceiver (quad-band 2G and tri-band 3G)	LFBGA135	7 x 7 mm
Peripheral chipset			
STLC2500D	Bluetooth 2.1 + EDR	WFBGA48	4 x 4 mm
TEA5990	Stereo FM/RDS receiver	HVQFN24	4 x 4 mm
GNS7560	Single-chip GPS receiver	WLCSP	PCB area < 25 mm^2
STLC4560	Single-chip IEEE 802.11b/g WLAN radio	LFBGA-240	8.5 x 8 mm

ST-Ericsson cellular system solution 6710 hardware overview

(1) available for 6708/6709/6710/6710X
(2) available for 6707/6708/6709/6710/6710X
(3) available for 6708/6709/6710/6710X

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